US009638347B2

(12) **United States Patent**
Yamamoto

(10) **Patent No.: US 9,638,347 B2**
(45) **Date of Patent: May 2, 2017**

(54) **DEVICE FOR BLOCKING A FLOW PASSAGE USING AN INFLATABLE BAG**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 34 days.

(21) Appl. No.: **14/644,729**

(22) Filed: **Mar. 11, 2015**

(65) **Prior Publication Data**

US 2016/0265680 A1 Sep. 15, 2016

(51) **Int. Cl.**

F16K 31/126	(2006.01)
F16K 7/10	(2006.01)
F16L 55/124	(2006.01)
F16L 55/134	(2006.01)

(52) **U.S. Cl.**

CPC ***F16K 31/126*** (2013.01); *F16K 7/10* (2013.01); *F16L 55/124* (2013.01); *F16L 55/134* (2013.01)

(58) **Field of Classification Search**

CPC F16K 31/126; F16L 55/124; F16L 55/134

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

1,388,890	A *	8/1921	Provich	F16L 55/124 138/94
1,860,855	A	5/1932	Gardner	
1,906,151	A *	4/1933	Goodman	F16K 7/10 138/93
3,842,864	A *	10/1974	Riegel	F16K 7/10 138/93
4,291,727	A *	9/1981	Yie	F16K 7/10 137/318
4,509,343	A	4/1985	Brister	
5,285,806	A *	2/1994	Ortega	F16L 55/124 137/15.08
5,624,206	A	4/1997	Cohen et al.	
7,000,641	B2 *	2/2006	Welfare	F16K 7/10 137/488

(Continued)

FOREIGN PATENT DOCUMENTS

DE	649534 C	8/1937
EP	0989344 A1	3/2000

(Continued)

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(57) **ABSTRACT**

An insertion guide tube that is inserted into a sealing case and that houses a blockage bag in a reduced-size state can be moved inside the sealing case and inside a branch pipe portion along an axis of the branch pipe portion until the insertion guide tube is brought into an abutting position in which at least a part of a leading end portion of the insertion guide tube abuts against an outer surface-side peripheral edge portion of a branch port on an outer circumferential surface of a fluid pipe. In a state in which the blockage bag is located at a predetermined internal flow passage blocking position, an axis adjustment portion that can make sliding contact with an inner surface of the insertion guide tube is located in a portion corresponding to branch port in a radial direction of the fluid pipe.

15 Claims, 14 Drawing Sheets